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Sustaining the Lean Ideology

Sanjay Bhasin and Pauline Found

Abstract

Purpose

The purpose of this paper is to explore the interface between Lean strategy and organisational transformation, by scrutinising the literature on why Lean strategies fail to be implemented and/or sustained.

Design/methodology/approach

As a conceptual and research paper it develops a hypothesis. It encompasses philosophical discussions and comparative studies of others' work and Lean thinking alongside its links to the principles, ideology, philosophy and the underpinning values. The search involved a total of 1,931 articles spanning across 75 different journals. The content analysis approach suggested by Mayring (2004) was selected.

Findings

Successfully implementing Lean is more complex than often recognized within literature and the alignment between strategy and organisational transformation is repeatedly not undertaken. The investigation indicates policy makers need to view Lean as an ideology and not simply another process.

Research limitations/implications

This paper addresses the inaccurate representation which exists of the concept of Lean as a strategy. Whilst a major evolution has occurred comprising the inputs

perceived as imperative for Lean success, a translucent empathy of its philosophy alongside an acknowledgement of the magnitude of the change and transformation necessary has been comparatively perplexing.

This paper has implications for academic scholars of strategy and organisational change as well as for practitioners seeking to implement organisational change.

Originality/value

Empirical evidence suggests that most Lean strategies struggle. Customers are becoming more demanding, markets are becoming more customised, and product life-cycles getting shorter are dictating that Lean needs to be embraced as an ideology.

Key words: Lean, ideology, philosophy, culture

Conceptual paper

1.0 Introduction

Adopting a Lean thinking as a complete business strategy to create competitive advantage and deliver long-term growth has often been attempted in organisations over the past three decades . This approach necessitates a deep understanding of both the strategy implementation process as well as the concepts of organisational change and Lean thinking (Balle et al. 2017), yet it is widely acknowledged that Lean strategies often fail to be entirely implemented Camp (2013) and Mostafa et al. (2013).

This paper investigates the paradox behind this. Implementing a Lean strategy is complex, requiring organisations to embrace Lean as an ideology, not simply as another process. Most Lean transformations are approached from a tactical rather than a wider strategic angle without undue emphasis on the transformation required (Biddle, 2006; Bhamu et al., 2014; Pullin, 2005). Wilson (2015) suggests that higher Lean maturity involves complex transformational changes which in turn demand cultural change. This incorporates an arrangement of leadership competencies, practices and behaviours enabling a Lean system (Marcel, 2018; Nogueira et al., 2018; Mann, 2014). Lean leadership requires aligning the Lean ideology and values with a clear vision (Wincel et al., 2013; Amir, 2016). Although Lean tools might be the most noticeable aspect of implementation, Mann (2014, p.26) reiterates, “80 % of the effort in Lean implementation is expended on changing leaders’ practices and behaviours, and ultimately their mind-set”.

Marcel et al. (2018), Toledo et al. (2018), Drew et al. (2016) and Liker (2004) believe that a Lean philosophy requires support to achieve enhanced quality with cost-

effectiveness, whilst distinguishing leadership and management needs. Emiliani (2013), Womack et al. (1990), Taher et al. (2016) and Liker (2011) deduce that Lean management is more complex than often acknowledged within the literature.

Large projects and transitions can endure failure rates approaching 70% (Holwey et al., 2018). Ransom's investigation (2008, p.4), deduced that "there are really only 5% who practise the art skilfully in a world class master practitioner kind of way".

Ifechukwude et al. (2014), Marcel et al. (2018), Nogueira et al. (2018), Secchi et al. (2019) and Shook (2010) propose Lean should not be regarded as an ad hoc project but as a principal change initiative.

Hoshin Kanri, also called policy deployment, is one of the business concepts that was developed in Japan to align policies with the strategic goals of the organisation (Hines et al, 2011). In Japan, Hoshin Kanri is the term for directional management, or directional control. It is the means for setting the direction for the organization; hence the 'shining needle', the needle in a compass that points to the 'True North' for the organisation. Hoshin Kanri encapsulates a proven methodology whereby the strategic goals of a company drive progress and action at every level (Atkinson, 2010).

This investigation argues that Lean needs to be viewed as an ideology within the methodology of Hoshin Kanri. It is broader than is generally considered by conventional companies, as Lean is an established philosophy, an organisational and improvement structure supplemented by a set of tools (Holweg et al., 2018; Piercy 2015, Atkinson 2010 and Wilson 2015). This investigation strengthens the argument for a wider, holistic strategic approach supported integrally by a major transformation,

for a Lean transition to be successful. It identifies a gap in the scant literature reinforcing the message that Lean is an ideology and not simply another strategy or policy. This paper's objective is to explore the interface between Lean strategy and organisational transformation, by investigating wide-ranging facets of its implementation. The theoretical underpinning dissects reasons why some companies are more successful than others. It interweaves with Nudge theory (Thaler et al., 2008) as a modern change management notion, assisting people to develop their thinking and decisions. Nudge theory can be regarded as a pioneering and valuable blueprint for managing change. It helps explain:

- People's thinking, decision-making and behaviour
- Ways individuals can enhance their thinking and decision-making,
- Change management, and the
- Obstructive stimuli on individuals.

Also of relevance, Nudge theory attempts to curtail the confrontation often evident within companies employing command and control tactics.

2.0 Methodology

An extensive review and synthesis of the literature on Lean, its principles, ideology, philosophy and values was undertaken, identifying dissimilarities and commonalities, observing patterns and trends. The search involved scanning 1,931 articles drawn from 75 different journals. A content analysis approach (Mayring, 2004) was pursued as it permits scrutiny of qualitative and quantitative data from either an inductive or

deductive viewpoint. The purpose was to develop an argument exploring the concept in a conceptual form; to construe meaning from the content of text data and thereby observe a naturalistic paradigm. Executing the evaluation involves a four-stage comprising material assembly, descriptive scrutiny, category assortment, and material appraisal (Shukla and Jharkharia, 2013). The review utilised four databases covering the period 1987 to 2020; namely Emerald Library, ABI/INFORM Global, EBSCO Business Source Premier and Google Scholar. Management journals were also scrutinised to ascertain industry sectors. The specific wording regards the search criteria is identified in Tables 1 and 2.

2.1 Inclusion and exclusion criteria

Predefined characteristics determined the boundaries of the literature search. This augmented the investigation's external and internal validity, advanced its practicability, was cost-effective and minimised ethical anxieties. Table 1 summarises the criteria:

Table 1

Inclusion and Exclusion Criteria

Table 2 amplifies the search criteria.

Table 2

Search Criteria

Figure 1 depicts all journals reviewed where the article searches that matched the

criteria exceeded 20 matches.

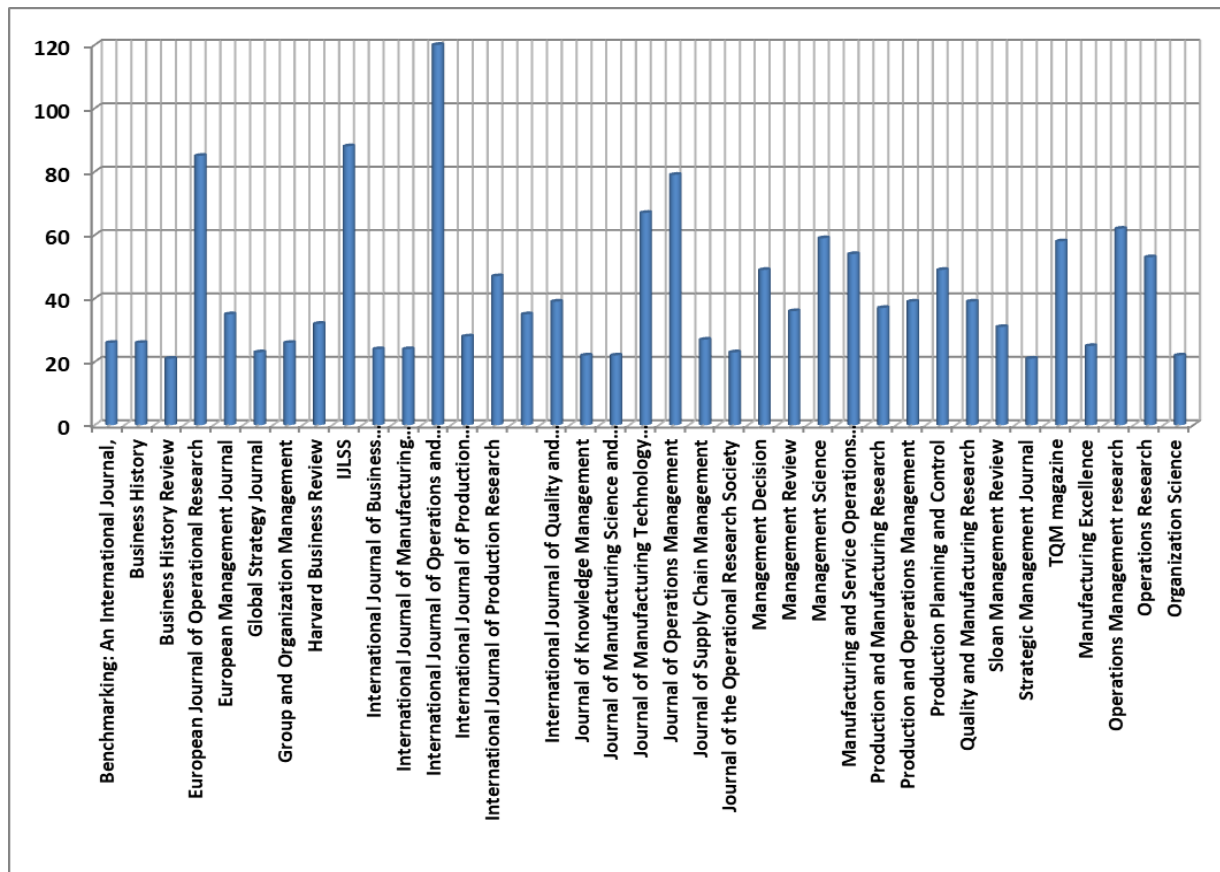


Figure 1: Journals with more than 20 matches found

Figure 2 identifies journals with fewer than 20 matches that are consequently less significant. Figure 3 drills down to the searches against “Lean” in order to determine whether Lean is viewed as an ideology or philosophy coupled with the transition journey for the 1,931 articles scanned.

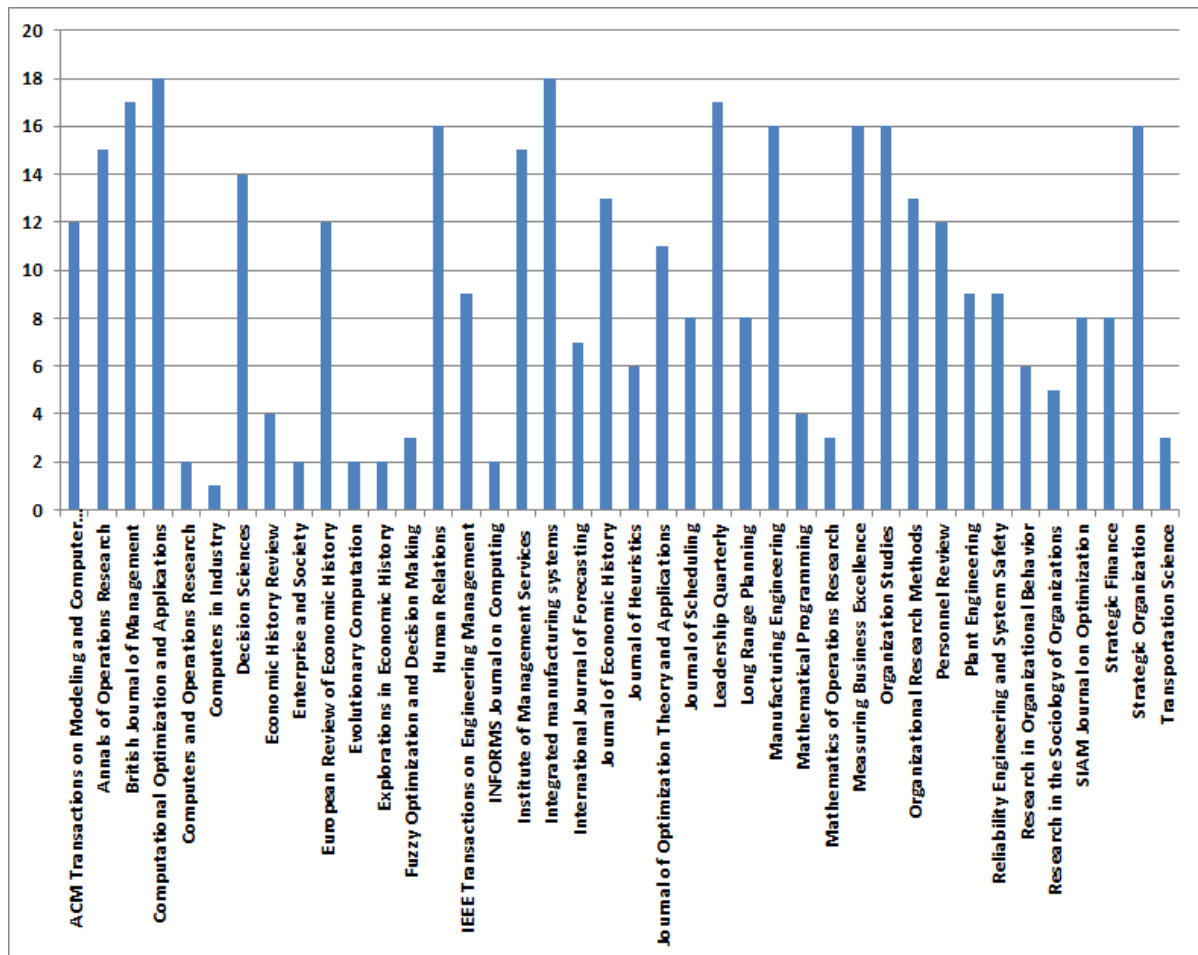


Figure 2: Journals with less than 20 matches found

2.2 Trends identified

The extensive search revealed the frequency of the following words in the distribution:

- Operational
- Process
- Wastes
- Tools and

- Culture, which accounted for 51% of the total. However, interestingly:
 - Leadership
 - Learning
 - History
 - Problems of Lean,
 - Its ideology and
 - Phases/stages only accounted for 10% of the articles.

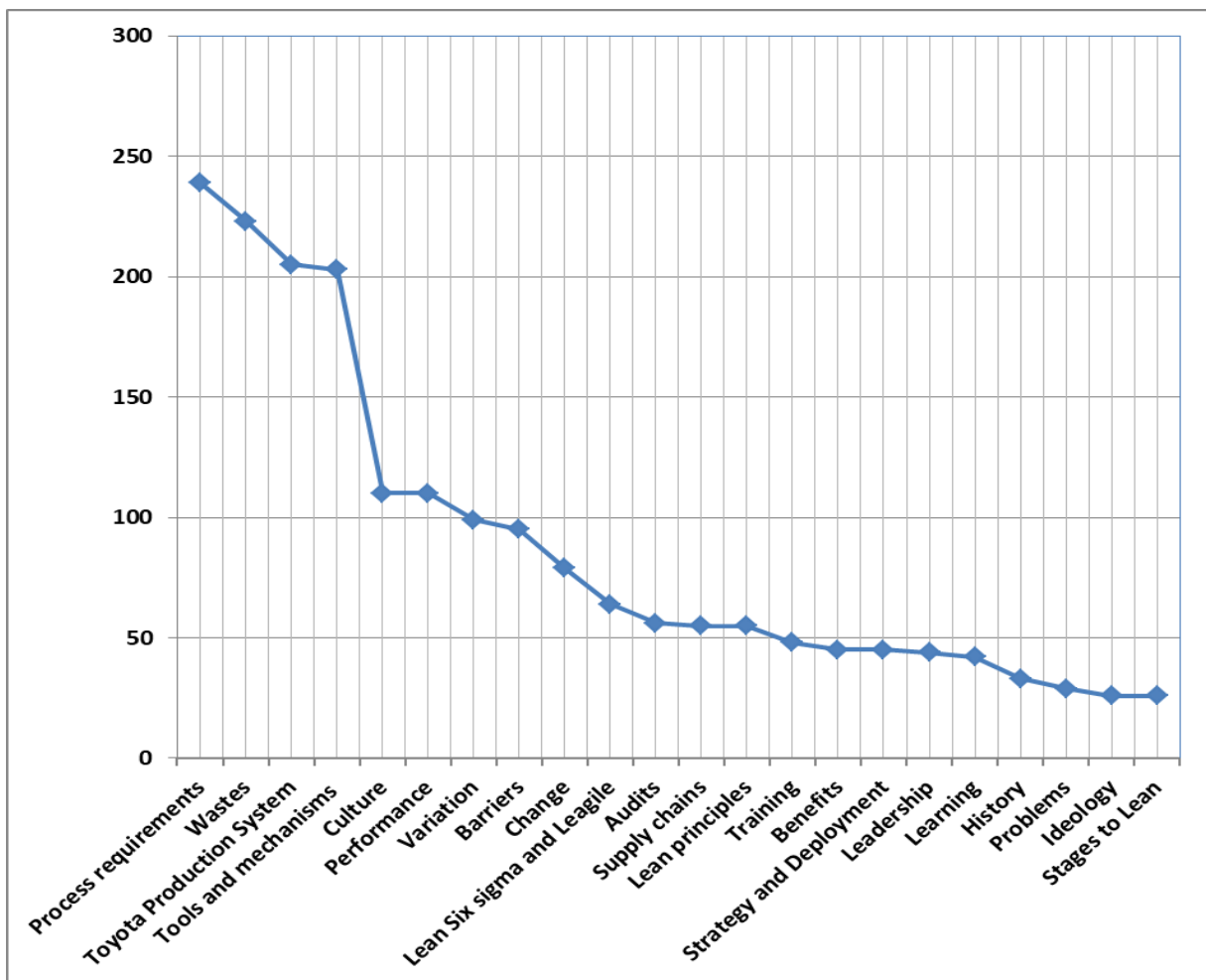


Figure 3: Concepts when jointly searched with “Lean”

3.0 Overall findings

3.1 Background to Lean

Husby (2007), Drew et al., (2016) and Koenigsaecker (2005) argue that Toyota's Lean philosophies were shaped by the characters, ethics and competences of its architects in the Toyoda family; namely, Taiichi Ohno, Shigeo Shingo, Sakichi and Kiichiro Toyoda. Literature suggests that the primary Lean objective is "to eliminate waste" (Lewis 2008; Jasti et al., 2015); we should add it is also about creating a flourishing and robust company (Singh, 2010; Mostafa, 2013). Smalley (2006) examine the example of Toyota who, from the outset, recognised that to compete in an aggressive market, they needed to control waste, which gave them the flexibility to remain competitive even though they could not dictate price levels. Atkinson (2010), Harbour (2001) Camp (2013) and Piercy et al. (2015) suggest that Lean and TPS do not simply fulfil the role of tools, but rather they offer answers to problems and uncover new prospects. Mostafa et al. (2013) suggest that Toyota coined the phrase "counter measure" implying that no "solutions" employed to tackle glitches were eternal. This manifests as better information is secured (Shook, 2010). Stone (2012), Gopalakrishnan et al. (2016) and Samuel et al. (2015), in summary, show how Toyota has instigated, managed, advanced and utilised many tools appropriately.

Bhamu et al. (2014) and Stone (2012) confirm that Toyota's objective within product and process development revolves around achieving profitable value streams. SMED and work-cells were incorporated within the TPS owing to their impact on waste (Drew et al., 2016; Taylor et al., 2013; Henderson et al., 2003; Fullerton et al., 2009).

Lean necessitates operating as an entire system, enabling employees to adopt the principles of continuous improvement (Singh et al., 2010; Cross, 2012; Hatch, 1997).

Table 3 summarises the tool growth within the TPS:

Table 3

Tool Growth within the TPS

3.2 Traditions of the Lean ideology

Stone (2012) suggests that Toyota began with the ideals and principles of the Toyoda family who, as rational optimists, recognised the values of knowledge management and experimentation, in contributing to an influential society (Spear, 2004; Jasti, 2015). *Lean Learning Enterprise* (Liker, 2004, p.306), encapsulates how Toyota constantly adjusts its culture to prevailing indigenous environments. Morgan (1997) and Mosley (2007) argue that many Lean implementations fail to recognise the team leader as pivotal to this philosophy (Stone, 2012). Their significance is higher as their numbers exceed tens of thousands; compared with about 50 TPS specialists within an organisation reflecting a workforce exceeding 200,000. Piercy et al. (2015), Drew et al. (2016) and Small (2004) point towards the management courses subsequently referred to as “Training within Industry.” Dimancescu et al. (1997) suggest that these principles are mirrored within the DNA of an organisation’s culture. Small (2004) argues that organisations implementing Lean must adopt it as a philosophy. Toyota’s Lean journey is constantly evolving (Mårtensson et al., 2019). The literature, however, depicts a bias towards Lean’s operational elements (Dalal, 2010; Mostafa et al., 2013; Bartels, 2005; Atkinson, 2010).

3.3 *Lean ideology should not be mistaken as synonymous with a religion*

Statements referencing Lean cannot be regarded as gospel (Shook, 2010).

Lean stands alone as an ideology, its principles and credibility founded wholly on reason and scientific methods (Jasti et al., 2015). Taiichi Ohno, Shigeo Shingo, Sakichi and Kiichiro Toyoda had faith in science to advocate the Lean ideology (Henderson, 2003). Jones (2009) suggests Lean is a rational, fully comprehensive, managerial and planned approach aimed at attaining effectiveness. By analogy, philosophy can be construed as endeavouring to fully understand the central interpretation of everything which exists, as initially emerged within the scripts of Herodotus and Thucydides (fifth century BC), and can be interpreted as the search of knowledge. The notion of philosophy has evolved seeking to address systematically two basic questions, namely:

- i. *What is the nature of whatever it is that exists? (ontology) and*
- ii. *How, if at all, can we know? (epistemology)*

Piercy et al. (2015) and Stone (2012) indicate how a philosophical debate should withstand rigorous scrutiny on its own credentials, by rational reasoning and cognitive behaviour. Gopalakrishnan et al. (2016), Angelis et al. (2011), Abolhassani et al. (2016) and Stone (2012) suggest Lean, as a cross-organisation philosophy, urges all factions to eliminate waste and find the added value customers are prepared to pay for.

3.4 *The longevity of the Lean ideology*

Ohno (1998) eloquently described how the TPS evolved from sequences of inventions bridging several decades. Womack et al. (2005), Gremyr et al.,(2012), Mostafa et al. (2013) and Laureani et al. (2012) suggest that processes intended to serve customers require prioritising. “The minute you think you’ve reached a destination, you’re actually done. You’re off the journey” (Campbell, 2006, p. 52). True Lean organisations persistently endeavour to secure the “True North” or a perfect position of excellence (Marksbury, 2012). Literature identifies stages which organisations undergo in their respective Lean journeys (Pakdil et al., 2017; Saurin et al., 2011, Schonberger 2008, Smalley, 2009, Taylor et al., 2013; Wheatley, 2005). Some argue that the journey cannot be time constrained as it depends on numerous inter-related and dependent factors (Schonberger, 2008; Saurin et al., 2011; Sadri et al., 2001; Pakdil et al., 2017; Stone, 2012). Atkinson (2010); Conti et al. (2006), Dey et al. (2013), Small (2004), Mayano et al. (2012) and Angelis et al. (2011) insist that an important ingredient is how the transformation supports an organisation’s overarching strategic intentions.

3.5 *Facilitating the Lean ideology in an organisation*

Radziwill (2013) states that Lean must be regarded as a system depicting integrated arrangements of fragments with a conspicuously distinct purpose. Organisations should discover their own ways of enhancing these tools (Liker, 2004; Wincel et al., 2013; Shook, 2010; Celani et al., 2011). Wan et al. (2008), McVay (2013) and Cocolicchio (2008) highlight the complexity of Lean implementations as, besides stimulating, they need to be pioneering. Bicheno et al. (2009) and Cross (2012)

emphasise that Lean should be extended across the entire value chain, if an organisation is to be resolute about its ideology.

3.6 The human side of the Lean ideology

Eisenhardt et al. (2010) and Celani et al. (2011) reference a phrase, “Before we build cars, we build people”. People are equipped sufficiently, thus enabling them to promote and adhere to the Toyota Way through appreciating the extent of the transformation required (Stump et al., 2012). This does not mean indulgence towards employees, but rather both inspiring and valuing the workforce so that they are able to achieve the appropriate balance to operate effectively (Hines et al., 2008). The literature implies that working around the culture is an option, but one which would never reap long-term success (Marksbury, 2012; Angelis et al., 2011; Zokaei 2013; Stone, 2012; Montgomery, 2010; Shook, 2010). To achieve the appropriate change, it is imperative that behaviour is altered, reinforcing the organisation’s strategic objectives (Laureani et al., 2012; Montgomery, 2010; Stepanie et al., 2012). Replicating a situation proven to be successful in another organisation is both imprudent and reckless (Camp, 2013; Skabelund, 2012). Zokaei (2013) Stepanie et al., (2012), Johnston, (2009) and Wincel (2013) recommend adopting and implementing strategic human resource management.

3.7 Lean ideology linkages to strategic direction and change

The literature is consistent in its message that Lean sustainability is characterised by

four traits: scale (organisation-wide), magnitude (influences the status quo), duration (can take years), and strategic importance (Clarke, 2011; Conti et al., 2006; Drew et al., 2016; Wincel et al., 2013; Secchi et al., 2019; Mostafa et al., 2013; Camp, 2013; Dey et al., 2013; Taylor et al., 2013).

Mårtensson et al. (2019) and Celani et al. (2011) argue the importance of customising the change transformation which occurs. Exponents (McVay et al., 2013; Marcel et al., 2018; Johnston, 2019; Cross 2012; Bartels, 2005) recommend systems, tools, and procedures at the organisation's disposal as summarised in Table 4.

Table 4

Linking Strategic direction to Change

3.8 *Lean ideology's economic reality*

Although literature suggests that the primary Lean objective “is to eliminate waste,” this should co-exist with a need to create a successful and robust business (Wilson, 2015; Saurin et al., 2011; Mostafa et al., 2013). Bhamu et al. (2014) and Stone (2012) detected that over a period of 15 years, this message was rarely evident amongst conference attendees, papers and texts which emphasised flow, value and customer fulfilment. Smalley (2006) notes how Toyota realised that for the company to compete in a hugely aggressive automotive sector, it was unable to set the price as the competitive market would determine how many units were sold. Consequently, costs were the leverage the organisation utilised to build competitiveness.

3.9 *Technical determinants to accomplish a Lean ideology*

Camp (2013, p.28) observes that “people say they are implementing Lean when they’re just implementing one or two of the elements”. Waurzyniak (2009), Stone (2012), Sawhney (2005) and Halliday (2005) suggest that generally a few tools may be redundant, a few may require modification and some new ones may be wanted. Lean is not, and never has been, opposed to new technology, but applies caution as it is not obliged to rush towards robotic resolutions (Williams et al., 2010). We witness this through the application of ‘Lean Sigma’ (Stone, 2012; Stump et al., 2012; Williams et al., 2012). Modig and Ahlstrom (2015), alongside Piercy et al. (2015), draw comparisons with Leagility and the de-coupling point principle whereby organisations need to consider the holistic impact of supply chain inferences systematically (Laureani et al., 2012; Stone, 2012.)

The literature illustrates how Lean tools should be applied, so as to assist both the organisation and the supply chain (Shook, 2010; Smalley, 2009; Womack et al., 2005). Research suggests that organisations need not restrict themselves to a few tools, but instead should consider the whole portfolio and apply them accordingly (Angelis et al., 2011; Black 2007; Conner, 2009; Dalal, 2010; Henderson, 2003; Laureani et al., 2012; Wheatley, 2005). The literature proposes certain protocols summarised in Table 4:

Table 5

Summary of protocols promoted in the literature

The approach by Spear et al. (1999) is summarised as the DNA of Toyota and an unvarying method of operating within Toyota. This is encapsulated by four rules:

1. Attempt to organise every activity
2. Endeavour to link every customer and supplier
3. Try and stipulate and streamline every flow
4. Always try to progress from trialling at the basic level to the ideal state.

The research shows how organisations profess to execute the above principles, although the commitment and level of application fluctuates (Cross, 2012). Lean remains an appropriate collaboration of man, tools and material (physical or intellectual). The objective is to develop outputs in an efficient manner (Angelis et al, 2011; Cross, 2012; Bhamu et al., 2012). Literature depicts the TPS as a house accommodating components such as kaizen, Jidoka and JIT.

Yet while these have held considerable historic significance, they fail to clearly epitomise the essence of the TPS. Eisenhardt et al. (2010) suggest that this lies in the Lean principles that promote honest power and impact. Figure 4 embodies this. Taylor et al. (2013) insist that every value chain signifies an intensely entrenched system promoted by genuine Lean systems scholars. These four rules enable outputs, ingredients and information flows via modest and precise conduits to uncover opportunities (Laureani et al., 2012). The pivotal component is the notion of standardisation (Henderson et al., 2013). Jasti et al. (2015) and Stone (2012) imply that organisations which succeed view problems as possible opportunities and gaps to achieve the ideal state. Learning that embraces knowledge management principles is inherent in progressive organisations (Marksbury, 2012; Piercy et al., 2015; Mann, 2005; Pakdil et al., 2017).

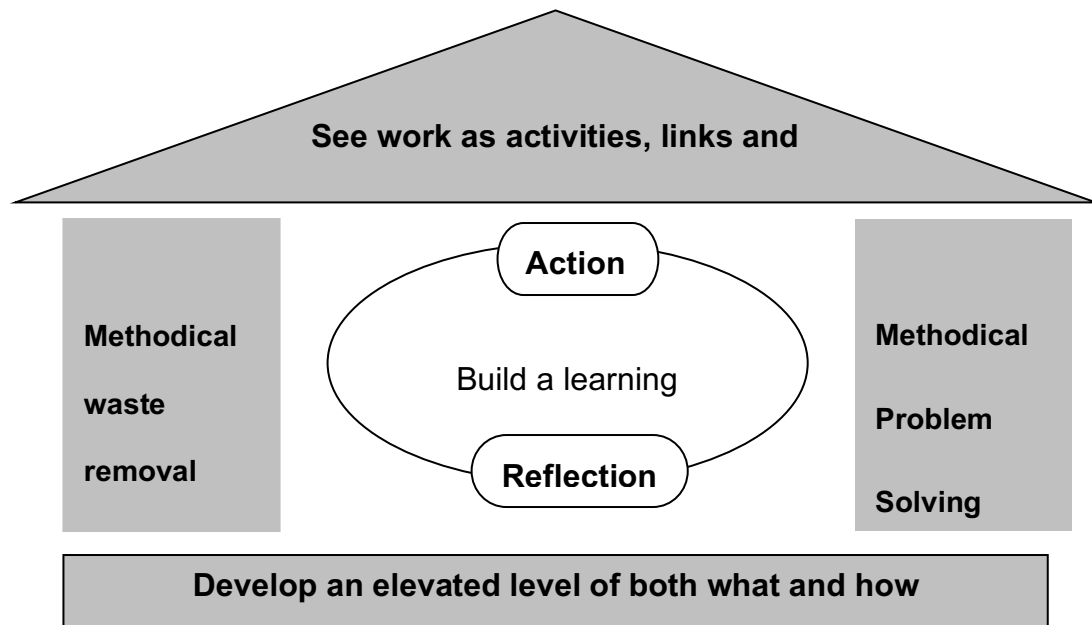


Figure 4

Lean principles

These principles aid effective implementation of the four rules alongside change (Spear et al., 1999) as depicted in Figure 5. Stone (2012) reminds us that Toyota failed to label its production system for over 20 years, but nonetheless pursued the principles and rules. They secured tangible improvements reflected by a host of performance metrics. At this stage the tools emerged and were either employed or further modified (Womack et al., 2005). Spear et al. (1999), whilst incorporating considerable academic precision regarding its outcomes, failed to provide adequate detail on how they were achieved. Facilitating change is energetic, onerous and calls for a considerable degree of doggedness, which is important within the current market conditions (Stone, 2012).

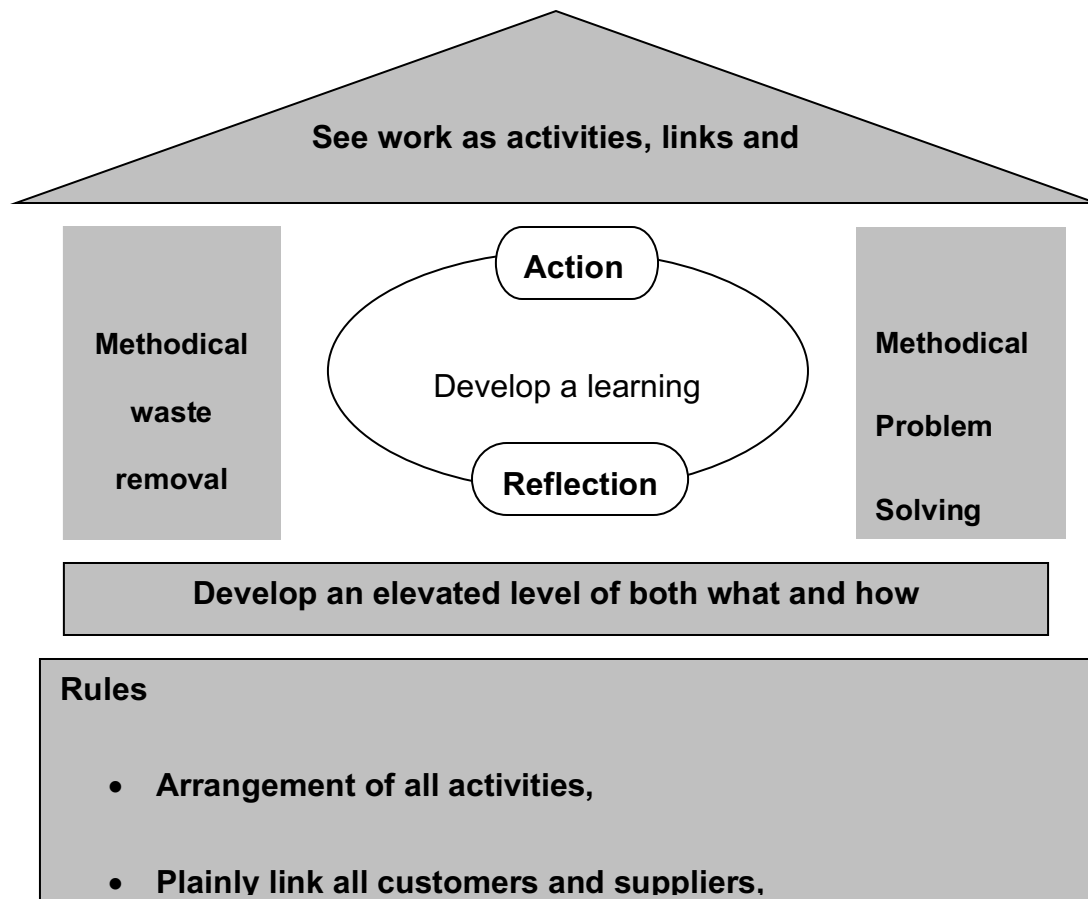


Figure 5

Lean principles with rules

3.10 Misconceptions about the Lean ideology

The Toyota Production System continues to pose difficulties for organisations to emulate; largely attributable to disparities within process management alongside the prevailing culture (Wincel et al., 2013; Mostafa et al., 2013; Sawhney et al., 2005).

The TPS is not identical to the Toyota way (Shook, 2010; Wilson, 2015). Johnston (2009) states that the Toyota Way incorporates the values of the culture depicted by Toyota enabling the TPS to thrive. Drew et al. (2016), Gopalakrishnan et al. (2016),

Montgomery (2010), Camp (2013), Celani et al. (2011), Piercy et al. (2015) and Taylor et al. (2013) reveal that academics and Lean practitioners unduly emphasise tools at erroneous stages or apply them inaccurately, which instigates criticism. Cooney (2002) argues that other manufacturing strategies can prove more useful; choice should depend on the prevailing market conditions. Kincaid (2014) identifies specific elements of the Lean ideology; namely mixed-model scheduling or heijunka, which tries to dampen or control the demand supply, and has prompted the popularity of agile conditions focusing upon demand unpredictability. Japanese business conditions, including lengthy contracts, are not replicated in the West (Mehta et al., 2005). We experience small volumes of disparate and unstable product lines (Kincaid, 2004).

Schonberger (2019) suggests that Lean has inadvertently complicated aspects and enabled misconstructions, citing confusing expressions and notions utilised, convoluted basics, and fortified silos. Often, through the encouragement of yellow, green and back-belts, situations have developed whereby excessive analysis is promoted and encouraged. Sawhney et al. (2005) and Gill (2003) argue that individuals suffer greater stress levels, impacting attrition and absenteeism rates and they cite the number of accidents. Owing to the demands placed on managers, it is suggested that Lean can be demanding (Gremyr et al., 2012).

4.0 Conclusions and lessons learned

The following provides a summary of the findings which could prove invaluable to researchers, managers, Lean specialists and/or other groups. Lean transformations

require a holistic approach, compelling organisational change including behavioural transformations, and alignment with the strategy (Atkinson, 2010).

Atkinson (2010), Conti et al. (2006), Dey et al. (2013), Small (2004), Thompson et al. (1996), Mayano et al. (2012) and Angelis et al. (2011) claim that successful transformations occur at the level of the organisations' individual employees. No single approach suits every organisation, thus necessitating customisation. Of particular relevance, Secchi et al. (2019), Hines et al. (2008), and Taylor et al. (2013) found that Lean needs enablers in the forms of supporting infrastructure and culture.

Saurin et al. (2011), Liker (2011), Cocolicchio (2008) and Andrea et al. (2017) stress that Lean is an intricate interconnected set of processes requiring strategic-level transformation alongside operational configuration (Cross, 2012; Wilson, 2015).

Most Lean failures can be attributed to the prevailing culture (Laureani et al., 2012; Montgomery, 2010; Stepanie et al., 2012). Some argue that this means strategic HRM encouraging empowerment; appropriate delegation and suitable communication systems need to be in situ (Secchi et al., 2019; Lee, 2008; Gill, 2003; Camp, 2013; Andrea et al., 2017; Clarke, 2011).

Clarke (2011), Toledo et al. (2018) and Stone (2012) advise that whilst the literature emphasises tools, their findings revealed that their implementation needs to be apt and timely, acknowledging the Lean juncture reached. Samuel et al. (2015), Wilson (2015), and Marksby (2012) insist that organisations need to regard Lean as a dynamic phenomenon and one which is constantly developing. This means that Lean is viewed as a long-term never-ending commitment (Henderson, 2003; Husby, 2007; Amir et al., 2016; Dey et al., 2013). A word of caution is offered by Mårtensson et al.

(2019), Drew et al. (2016) and Amir et al. (2016), who suggest that companies applying Lean thinking tend to possess the knowledge of tools and techniques but frequently fail in direction, planning and adequate project sequencing. Mårtensson et al. (2019), Campbell (2006), Stone (2012) and Harbour (2001) add that there needs to be an acknowledgement that organisations are unique and likely to have distinctive problems and constraints and find their own solutions.

To achieve success, it is necessary to re-arrange existing processes and profoundly restructure tomorrow's outputs, assembly processes and supply chains. Lean supply chains should be closely affiliated to prevailing customer demand (Mårtensson et al., 2019; Celani et al., 2011; Bhamu et al., 2014). Lean ideology acknowledges it is a sum of the various components. Better performers manifested Lean throughout the value chain, as observed by Gopalakrishnan et al. (2016), Secchi (2019), Jones (2009), Campbell (2006), and Mayano et al. (2012).

Lean is a business philosophy, according to Wilson (2015), Piercy et al. (2015), Wan et al. (2008), Henderson (2003), Secchi (2019) and Wincel et al. (2013). Long-term and sustainable results are delivered by Lean, but the necessary infrastructure, commitment, dedication and planning factors need to be in existence. Lean is a journey that must start strong and never ends. Companies deemed successful have fundamentally altered their operating systems and adopted a unique strategic focus. The key message is that an organisation's Lean efforts must be linked to its overall business goals through Hoshin Kanri or policy deployment. This permits moving towards improved competitiveness through perfecting overall performance. When these components were found to be in place and Lean implemented with appropriate

values and principles, overall organisational performance improved, as revealed by Fullerton (2009), Saurin et al. (2011), Bhamu (2014), Collis (2016), Holweg et al. (2018) and Schonberger (2019).

5.0 Research limitations and Implications

This paper addresses the inaccurate representation which exists of the concept of Lean as a strategy by demonstrating, the complex relationships that exist between the process of organisational change and the methods of embedding the change within the organisation. The research was undertaken on the literature of a vast number of Lean implementations as there exists a comprehensive catalogue of Lean failures, and successes, from which some generalisations can be drawn. For successful implementation of a major strategic, organisational change, it is essential to take a holistic perspective that address both the cultural aspects as well as the technical ones. It is not sufficient to change manage only the technical details of the processes without consideration of how the change will impact on the people within the organisation. In the case of Lean, those organisations that implemented Lean as a philosophy succeeded to embed the change as a long-term strategic move, whilst those that took a technical, tools-based, approach generally failed to embed the change.

This paper has implications for academic scholars of strategy and organisational change as well as for practitioners seeking to implement organisational change.

In terms of research limitations, whilst peer-reviewed journals and conference papers were fully scrutinised, manuals, reports, and white papers were not considered and this could be seen as a limitation of the research as much of the

literature on Lean implementations are not in the academic literature, but in the voluminous grey literature and company documents. To have covered all the academic and grey literature in such an exhaustive method would have been beyond the scope of this study. Hence, the research focussed on the literature which had been peer-reviewed and contributed to the knowledge base of the subject, whilst acknowledging that further research would be needed to get a full picture.

Also, although Lean principles are increasingly employed within the service sector, this investigation concentrated on manufacturing, the rationale being that, tool choice, objectives, possible hindrances alongside the predominant cultures contrast noticeably between the sectors. This may be considered as a research limitation but combining both sectors would have made deductions regarding trends difficult to decipher.

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